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AGRICULTURAL NEWS LETTER

VOL. 13 - NO. 3 MAY-JUNE, 1945

This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations of the du Pont Company and its subsidiary companies. It also contains published reports and direct contributions of investigators of agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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CONTENTS

	Page
Copper-A Compound Controls Numerous Plant Diseases	52
Proper Timing and Application of Sprays and Dusts	53
Snakeholing or Mudcapping?	53
Less Cobs per Bushel of Ear-Corn on Well-Fertilized Soil	54
A Pond for Every Need	54
Dimethyl Phthalate Repels Mosquitoes, Flies, Fleas, and Gnats	55
"Most Effective Chemical for Eradication of Poison Ivy"	55
"Fermate" Controls Damping-Off In Connecticut Tobacco Tests	56
"Fermate" and PDB for Control of Tobacco Mildew	56
Mechanical Arms Save Manual Labor in Citrus Groves	57
Seed-Treating Machines Apply Disinfecting Dusts	59
Trend in Seed Disinfection for Grain Is Toward Custom Treating	59
Smear 62 Eliminates Need for Confining Animals	61
Feed Manufacturer Makes Practical Test of Urea in Dairy Feeds	63
Dynamite Makes Untillable Land Yield 85 Bushels of Corn per Acre	66
Producing More Beef from Phosphorus-Deficient Ranges	68
Crooked Stream Retards Water Runoff	69
Formaldehyde In Control of Decay and Rind Injury in Citrus	70

COPPER-A COMPOUND CONTROLS NUMEROUS DISEASES OF MANY PLANTS

Not satisfied with certain fungicides used to control many important diseases of farm crops, Du Pont chemists several years ago launched laboratory and field research which resulted in development for that purpose of a superior product, called Copper-A compound.

The new product has been available in limited commercial quantities for four years, largely for evaluation and testing by growers. Now, because it has been consistently effective in controlling numerous diseases without stunting plants or reducing fruit size or crop yield, production is being increased so that adequate amounts will be available for this year's crops.

Safer Than Bordeaux Mixture to Various Copper-Sensitive Plants

"Development of this material meets the need for a copper fungicide safer than Bordeaux Mixture to various copper-sensitive plants," according to a leaflet prepared by the Grasselli Chemicals Department primarily for growers of such crops as celery, tomatoes, potatoes, sugar beets, cherries, citrus, peppers, carrots, grapes, and the cucurbits including cucumbers, cantaloupes, muskmelons, watermelons, and squash.

The Bordeaux Mixtures and mono-hydrated copper sulfate-lime dusts often cause serious injury to plants either in cool, wet weather or when it is very hot and dry. Copper-A is the result of the efforts of Du Pont chemists to produce a highly effective, stable compound with low solubility, yet having a high copper content of 45 to 47 per cent, expressed as metallic copper, the leaflet says.

Can Be Used Either as A Spray or Dust

The leaflet points out that Copper-A can be used either as a spray or a dust. It saves time and equipment required for making Bordeaux Mixtures. Simply add the right amount of the compound and, where desirable, a spreader-sticker, to the water in the spray tank. Copper-A also saves wear on equipment, pipes, and lines, as the amount of solid materials used is less than one-fourth the amount used in Bordeaux. The compound gives a more uniform coverage, and therefore more uniform results. As it does not involve weighing and slowly adding two separate ingredients to the spray tank, necessary with Bordeaux, it eliminates the hazard of different tankfuls varying in composition and results. It does not cake nor lose effectiveness when exposed to air. As a dust, it may be applied at any time of the day favorable for dusting, whereas "copper-lime" dusts must be applied only when plants are wet with dew.

Leaflet Gives Recommendations for Use of Copper-A

The leaflet outlines directions for its use for various crops, and gives results of experiments. It says that in commercial tests in Florida, the

Continued on next page

Copper-A spray gave 119 more crates of celery, with longer stems and larger bunches, per acre than did the copper spray previously used, plus lime-sulfur solution. On 2.4 acres, the newer spray, applied on the same dates as the other, gave 1,337 crates; the older spray only 1,051 crates.

NOTE: Copy of leaflet on Copper-A compound will be sent upon request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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PROPER TIMING AND APPLICATION OF SPRAYS AND DUSTS ESSENTIAL

Failure of an insecticide or fungicide to control insects or plant diseases of fruit or other farm crop is not necessarily the fault of the chemical used. Dr. Harry F. Dietz, Du Pont entomologist, recently told the Pennsylvania Horticultural Association that a poor, ill-timed application of a recommended spray or dust, resulting in inadequate or improper coverage at the wrong time, means poor control of such insects and diseases as codling moth, plum curculio, rosy aphis, red mite, leafhopper, San Jose and scurfy scale, cedar rust, sooty blotch, and bitter rot. To show the importance of right timing, he said: "It cannot be overstressed that the codling moth must be controlled by the first brood spray program, and scab by the time the second cover spray is applied. Otherwise, even the most strenuous measures, in a season favorable to either pest, may fail completely."

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SNAKEHOLING OR MUDCAPPING? IT DEPENDS

The most practical method of blasting boulders into removable fragments with dynamite depends on the location of the rock. If it is on the surface or only slightly imbedded in the soil, the mudcapping method is recommended, according to Du Pont explosives experts. This calls for placing the required number of cartridges on top of the boulder for subsequent firing, with three or four inches of mud placed over the top of the charge, particularly to hold the charge in place on a slanting boulder. The snakeholing method requires digging a hole under a buried boulder, large enough to pack the explosive charge in a mass close up under and against the rock so that it will break the boulder as it is blown out. An experienced blaster should be employed.

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Agricultural News Letter (Du Pont)
Vol. 13 No. 3 May-June, 1945

LESS COBS, MORE GRAIN PER BUSHEL OF EAR-CORN GROWN ON WELL-FERTILIZED SOIL

Farmers who apply adequate plant food in the form of nitrogen, phosphorus, and potassium -- and calcium where needed -- to their soils to increase yields have an additional incentive in the case of corn. It has been established that cobs make up a much smaller proportion, and grain a much larger percentage, of the crop when grown on properly fertilized and well-handled land.

Prof. H. J. Snider, assistant chief in soil experimental fields, University of Illinois College of Agriculture, says this reduction in cob production is desirable because cobs have little or no value as feed for livestock or as nutrient for plants.

He reports that corn grown at the Ewing, Ill., Experimental Field on properly fertilized land contained 15 per cent or 10.5 pounds of cobs per 70-pound bushel of ear-corn. The same hybrid, U. S. 13, from untreated land on this field contained 20 per cent or 14 pounds of cobs per bushel of ear-corn. He adds:

"This means that each 100 bushels of ear-corn grown on this untreated land contained 350 pounds more cobs than 100 bushels of the same hybrid grown on treated land."

On this basis, he points out, a farmer who doesn't fertilize, "shortchanges himself by 5 bushels of grain in each 100 bushels of corn produced. When he buys ear-corn grown on this type of land, he is subject to the same shortchanging process. The extra poundage of cobs must be handled out of the field, into and out of the crib, and into feeders."

He quotes C. J. Badger, who supervises a number of experimental fields in Southern Illinois for the College of Agriculture, as saying that in addition to nitrogen, phosphorus, and potassium, lime was also applied in the Ewing test because the soil was very sour.

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A POND FOR EVERY NEED!

Duck ponds. Fish ponds. Ice ponds. Ranch-irrigation and drainage ponds. And ponds for water storage. All can be constructed easily and economically with dynamite. So says a new Du Pont booklet, "Ditching with Dynamite," which discusses a lot of things, including the making of ponds, in addition to procedures for blasting drainage canals and ditches. The booklet points out that 40 feet is usually the maximum width of a pond that can be excavated by dynamite, although this has been exceeded under very favorable soil conditions and with the aid of strong winds. It describes various plans for shooting a pond, a different procedure being recommended for a shallow pond from the one for a deep pond. It also cautions farmers to obtain expert advice before attempting to blow a pond with dynamite.

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DIMETHYL PHTHALATE REPELS MOSQUITOES, FLIES, FLEAS, GNATS, AND CHIGGERS

Vastly better successors to citronella as an insect repellent will be a post-war boon. One important substance the Army has found to be better than old-line "fly-dopes" is dimethyl phthalate, derived from the chemical essential in making the synthetic resin for "Dulux" enamels. Dimethyl phthalate, probably combined with other substances, will protect for hours against mosquitoes, flies, fleas, gnats, sandflies, and chiggers. It is partially effective against ticks. The material -- not new to industrial chemistry but now given a new use -- is not an insecticide but an insectifuge or repellent.

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"MOST EFFECTIVE CHEMICAL FOR ERADICATION OF POISON IVY"

"The most recent and most effective chemical for eradication of poison ivy seems to be ammonium sulfamate, which has been tried out with marked success by the New Jersey Experiment Station," says that Station's Circular 482, "Poison Ivy," by Miss Jessie G. Fiske, state seed analyst.

The circular discusses distinguishing characteristics of the ivy plant, poisonous principle, symptoms and treatment of poisoning, as well as methods of eradication. Crediting Herbert R. Cox, extension agronomist, for suggestions on eradication methods, the circular says of ammonium sulfamate:

> "The chemical comes in dry form and should be dissolved in water -- 3/4 pound of the material to a gallon of water. Applied in the form of a spray, a gallon should be adequate for approximately 200 square feet. Spraying is best done on a bright day in July or August. In most instances, a single application will kill all the foliage in 2 weeks, but a very dense growth may possibly require a second application."

Kills Other Weeds Too -- Must Be Kept Off Cultivated Plants

The circular says that ammonium sulfamate is particularly destructive to poison ivy, but will kill other weeds and plants. It adds:

> "Cultivated plants will probably be damaged if their foliage is touched by the spray, but if only their trunks or stems are touched, the chance of injury is slight."

NOTE: For leaflets on "Ammate" weed killer, containing ammonium sulfamate, write the Editor, "Agriculture News Letter," Wilmington 98, Del.

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"FERMATE" CONTROLS DAMPING-OFF IN CONNECTICUT TOBACCO TESTS

In experiments at the Tobacco Substation at Windsor, Conn., to determine the efficacy of "Fermate" fungicide for control of mildew in tobacco seedbeds, it was observed that many of the unsprayed plants were attacked by damping-off fungi, "and sometimes it was not possible to determine how many of the plants died from damping-off and how many from mildew attacks."

So says Connecticut Experiment Station Bulletin 478, which adds: "Both diseases affected the same plants and usually killed them. Plants treated with 'Fermate,' however, never were affected by damping-off. Although no experiments were undertaken to test 'Fermate' for damping-off alone, the results clearly show that 'Fermate' may also be used to control damping-off."

BULLETIN DISCUSSES "FERMATE" AND PDB FOR CONTROL OF TOBACCO MILDEW

Growers of tobacco who have not been sure whether to continue using para-dichlorobenzene (PDB) to fumigate or the newer "Fermate" fungicide to spray for control of mildew in seedbeds have been given an answer.

Since "Fermate" is a preventive spray, and use of PDB is a curative practice, the two naturally complement each other, according to P. J. Anderson, T. R. Swanback, and S. B. LeCompte, Jr., in Connecticut Experiment Station Bulletin 478, reporting experiments conducted by the Tobacco Substation at Windsor. "The grower who is prepared to use either or both, as conditions require, has a well-rounded program and should have no fear of losing his plants. Many large growers are prepared to play safe and use both methods, if necessary. They spray with 'Fermate' when the seedlings are small and use PDB if mildew appears in the later stages." The bulletin says that while few growers have to resort to fumigation, "under favorable weather conditions, it might be necessary."

It adds that whether to control mildew by fumigation with PDB or by spraying with "Fermate," the active ingredient of which is ferric dimethyl dithiocarbamate, "will depend on the grower's preference and on the condition of the beds. Many growers have beds of such loose construction, or leaky sash, that they cannot hope to fumigate successfully because the PDB vapor escapes too rapidly. For such growers, 'Fermate' spray is best -- in fact, the only remedy. Many growers who have tried both methods think the 'Fermate' spray is less trouble than the fumigation method. They also consider it less expensive. Others, however, find the fumigation method less trouble."

Continued on next page

"Fermate," Properly Used, Gives "Perfect Control of Mildew"

The value of paradichlorobenzene for control of mildew has been thoroughly established by experiments at Windsor and elsewhere, and by growers. Experiments at Windsor, coupled with grower experience, show that "Fermate" gives "perfect control of mildew" when properly used, the Connecticut scientists state.

Discussing its use by growers, the bulletin says that a large number sprayed their beds with "Fermate" with uniformly satisfactory results when the chemical was properly used. It adds:

"Letters came from several of the large corporations that grow hundreds of acres of tobacco reporting excellent results with 'Fermate.' We had opportunity to watch carefully throughout the spring the spraying operations of two of these companies that are growing over a thousand acres of tobacco and had the seedbeds widely distributed in a half-dozen towns. No mildew was found at any time on any of their beds."

The bulletin points out that mildew can also be controlled by use of bismuth subsalicylate or benzyl salicylate, but emphasizes that they gave no better control than "Fermate," and that in addition to other disadvantages, the salicylates "are not as simple to prepare and are more expensive."

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MECHANICAL ARMS SAVE MANUAL LABOR IN CITRUS GROVES

That old one about necessity being the mother of invention is vividly demonstrated by a new development resulting from the acute wartime labor shortage in agriculture.

It is a two-armed machine-powered tent puller that covers citrus trees with canvas to form a fumigation chamber into which deadly hydrocyanic acid gas is released to kill destructive insects.

Only Small Part of California Fumigated Acreage Still Tented By Hand

With approximately 80 pullers of more or less standardized design in operation in California, only a minor proportion of the fumigated acreage is still tented by hand.

Formerly, surrounding a tree with a tent took poles, ropes, and much time and hard labor by a sizeable crew of trained grove workers. Fumigators and growers have long dreamed of the day when this back-breaking, time-consuming work could be done mechanically, but it took the war to produce a successful machine, according to a statement from the El Monte, Calif., plant of the Du Pont Electrochemicals Department, suppliers of cyanide fumigants for 50 years.

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"Experienced fumigators state that on dry summer nights a husky hand crew, if available and willing to work, can cover as many 45-foot or smaller trees as a mechanical puller," according to a circular prepared by the Bureau of Pest Control of the California Fruit Growers Exchange. "When trees become damp, the puller will average more trees, upward to twice as many or even more with the largest tents in use, as damp tents in no way deter a machine puller. In recent years much fumigation has been in late fall and winter when conditions are damp, and pullers have gone right ahead, averaging twice as much as expected of a hand crew and usually with a better centering over the trees. Since payment of workmen is usually on a per-tree basis, the increased number of trees means greater remuneration and is probably the primary reason, aside from the fact that puller work is easier than hand, for holding men in this pest-control field. Without mechanical pullers, fumigation would almost have been discontinued in most districts for the duration."

How Mechanical Tent Pullers Work

The new device is equipped with long arms resembling railroad-crossing barriers. These arms are attached to the opposite ends of an axle-like rod, which is longer than the widest tree. When lowered at the beginning of the operation, the arms lie parallel along opposite sides of the tree, with the axle forming the third side of an open square. The tent lies in folds on the ground along this fourth side, and is attached to the ends of the two arms. A motor slowly lifts the arms high into the air, carrying the canvas up and over the tree. As the arms start downward on the last half of the semi-circular sweep, the canvas is released and floats gracefully toward the ground to cover the tree completely. After the first row of trees has been covered, the tents are moved to the next row by pulling them off the first onto the second.

Crew of Five Workers Needed

A crew of three men is needed to operate the mechanical tent puller, one for the tractor and two to attach the tents to the arms. Two additional men are required, one to measure the distance around the tents and the other to operate the "Hydro-Cy" vaporizer which heats, measures, and pumps the HCN gas under the tent. Thus, in all, five men are used.

The hydrocyanic acid gas, being slightly lighter than air, is released at ground level through a hose and distributing nozzle placed under the tent. The warm gas quickly envelopes the tree within the enclosure and destroys the scale insects without harming the tree.

NOTE: Subject Series No. 2 of "The Exchange Pest Control Circular," prepared by R. S. Woglum, entomologist, Bureau of Pest Control, California Fruit Growers Exchange, November 1944, gives detailed information on "Tent Pulling Apparatus in California Citrus Groves." A copy of this illustrated circular will be sent upon request to the Exchange at Los Angeles.

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SEED-TREATNG MACHINES APPLY DISINFECTING DUSTS QUICKLY AND EASILY

"Seed disinfection formerly was a long, laborious process. Soaking seed in sea water or sprinkling it with brine, the first recorded methods of grain seed treatment, was inconvenient and troublesome. We can hardly blame our great grandfathers for not treating seed grain more extensively.

"The improvements in chemicals and methods of application of seed disinfectants during the past 40 years have caused them to be more widely used, but it was not until the dust disinfectants were introduced that grain seed treatment really became popular. These seed disinfectants have been improved until now dust treatments that kill the disease organisms on the seed either by contact or fumigant action are giving more nearly complete control of seed-borne diseases than ever before.

"The introduction of high-capacity, power-operated treaters, with excess dust collecting devices, for applying improved disinfectants really has made it possible for the job to be quickly and easily done." -- C. E. Graves, Du Pont Semesan Company.

TREND IN SEED DISINFECTION FOR GRAIN IS TOWARD CUSTOM TREATING

The trend in seed disinfection is definitely toward custom treating, with installations of commercial seed treaters for such major crops as grain increasing rapidly in number. For instance, during the past eight years, 82 commercial treaters have been installed in Minnesota alone. As a result, more and more seed is being treated each year.

This important agricultural development and the need for its encouragement and expansion were recently explained by C. E. Graves, Du Pont Semesan Company plant pathologist of Wilmington, Del., in a paper prepared for presentation to the annual meeting of the North Dakota Farmers Elevator Association in Fargo.

Mr. Graves pointed out the exceptional opportunity elevator men have to help their farmers, themselves, and their communities, as well as the wartime and postwar food-production programs now so constantly emphasized throughout the world.

"The disinfection of seed grain to control surface and seed-borne diseases and to prevent decay is now universally recognized as a sound, profitable agricultural practice," Mr. Graves said. "Effective disinfectants have been available

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for a number of years, yet much seed that should be treated is not being treated, largely because suitable treating facilities have not been established on a wide scale. Yet statistics show that every year more and more farmers are sold on the idea of planting treated seed. This year, next year, and the year after, many others will decide to plant treated seed, and a lot of them are going to call on you elevator operators for help."

Modern Seed Treaters Do Job Almost By Themselves

Mr. Graves said elevators equipped to do cleaning can also treat with very little extra cost for time or labor. Seed can be moved directly from the cleaner to the treating machine and be treated as fast as it is cleaned.

"All the operator has to do is to calibrate the machine occasionally to see that the right dosage of dust disinfectant is put on the seed," he said. "If he keeps the powder box full, the treater will do the rest.

"When an elevator operator decides to install a seed treater and do custom treating, there are several things he should consider. To do a good job and do it fast, he must use a high-capacity treater. They can be had with capacities up to more than three hundred bushels per hour. Any one of several kinds of power-driven treaters or some gravity treaters are suitable for treating grain. They all are designed to mix the powdered disinfectant with the seed. Since the most widely recommended seed disinfectant combines fumigant action as well as contact with the smut spores for effective kill, any machine that will thoroughly mix the powder and the seed grain in the correct proportions will do a good job of treating.

Importance of Adequate Dust Control

"I want to emphasize one point about equipment for applying dust disinfectants on seed. Even apparently harmless dusts, such as flour and cement, can cause serious injury if inhaled over long periods or in excessive amounts. Seed disinfectants are even more dangerous because all of them, whether odorless or non-odorless, irritating or non-irritating, are injurious to the human system when inhaled in sufficient quantities.

"It is important that you provide adequate dust control, particularly at the sacking end of the treating machine. Dust control has been practiced in elevators for years, so you know a lot about how to make a satisfactory installation. However, I would like for you to pay particular attention to the discussion of dust control, as summarized in our 'Commercial Seed Treating' circular*. The details for constructing a simple and relatively inexpensive dust exhaust system are pointed out. An efficient system is diagrammed on the back of the circular.

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*Copy will be sent on request to the Editor of "Du Pont Agricultural News Letter," Wilmington 98, Del.

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The Situation In North Dakota

"Those of you who contemplate installation of custom treaters in the near future will be interested in these facts: There are approximately 75,000 farms in North Dakota where treated grain should be planted. These provide an excellent potential market for your services. Each year the farmers of this state plant approximately 14,000,000 bushels of wheat, oats, barley, flax, millet, and corn. The North Dakota Agricultural Experiment Station Bulletin No. 331, published only last year, gives you results of studies on seed treatments for these crops. The statistics show the benefits that are obtained from seed treatment. I would suggest by all means that you write to the North Dakota Station at Fargo for a copy, if you have not already done so."

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SMEAR 62 ELIMINATES NEED FOR CONFINING ANIMALS TO TREAT FOR SCREWWORMS

Chemical research has given cattle and other range livestock in the United States a practical response to the plea:

"Don't fence me in!"

A recent contribution by government scientists has largely eliminated the need for keeping animals corralled for daily treatments to control screwworm infestations. It is the formula, discovered and developed by the U. S. Bureau of Entomology and Plant Quarantine, for a thin paste called Smear 62, containing diphenylamine, benzol, turkey-red oil, and lampblack.

Can Be Applied to Wounded Animals When and Where Found On Range

This medicament, which the U. S. Agricultural Research Administration characterizes as "the safest and most rapid means of killing screwworms in animal wounds," can be administered by range riders to wounded animals when and where they find them.

Previous to the announcement for Smear 62 in 1941, benzol was used to kill the worms, and pine-tar oil to repel the flies and to aid in healing. Both required daily individual treatments, which meant keeping the animals confined. The delay and expense involved in fencing the animals centered attention on the need for an effective single treatment which could be applied wherever infested livestock happened to be located on range.

The result was Smear 62, "a single treatment that kills all screwworms in a wound up to the size of half a dollar, and protects it against reinfestation until it heals," according to Dr. Walter E. Dove, in charge, Division of Insects

Continued on next page

Affecting Man and Animals, writing in Research Achievement Sheet No. 15E, recently issued by the U. S. Department of Agriculture.

Diphenylamine Best of 1,200 Chemicals Tested for Killing Larvae In Wounds

Diphenylamine was found to be the best of 1,200 chemicals tested for its value in killing young larvae hatched from eggs laid by flies in wounds, Dr. Dove reports. It was therefore included in Smear 62, which can be applied with a small paint brush to both wet and dry wounds, such as those caused by shear cuts, branding, castration, dehorning, and by injuries from needle grass and cactus.

According to Dr. Dove, diphenylamine is not a repellent to adult flies, which continue to lay their eggs on treated wounds where Smear 62 can accomplish its deadly work of destroying the larvae. He adds: "By watching for injuries to livestock and giving prompt treatment, stockmen are able to prevent many deaths due to screwworms and check the spread of the pest."

Smear 62 Most Effective Remedy Found to Date -- Research Being Continued

That research workers in the Agricultural Research Administration are not content with their findings to date is shown by the following from Achievement Sheet No. 15E:

"Although Smear 62 is the most effective remedy found to date, continued research is essential to discover one material which in itself will give even better results than the mixture contained in Smear 62. Owing to differences in grades of lampblack and turkey-red oil, uniform mixtures are difficult to make. Some are too thick, some too thin. It is also desirable to find a substitute for lampblack, which discolors everything it touches. A nonvolatile larvicide is also needed as a substitute for benzol, one of the important ingredients of Smear 62."

Credits Scientists Who Participated In Development of Smear 62

Dr. Dove credits E. C. Cushing for early work in connection with screwworm control, and names the following for participation in the development of Smear 62: Roy Melvin, E. F. Knipling, R. C. Bushland, C. L. Smith, H. E. Parish, and W. L. Barrett, Jr.

NOTE: A copy of Research Achievement Sheet No. 15E, which discusses the development of Smear 62, may be obtained by writing the Agricultural Research Administration, U. S. Department of Agriculture, Washington 25, D. C.

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Vol. 13 No. 3 May-June, 1945

FEED MANUFACTURER MAKES PRACTICAL TEST OF UREA IN COMMERCIAL DAIRY FEEDS

Summary of Results of Experiment Conducted at Roanoke, Va.

Results of the use of urea in commercial dairy feeds in a test conducted by Lindsey-Robinson & Company, feed manufacturers, Roanoke, Va., utilizing a local college herd of cows, are summarized by Dr. W. H. Hastings, nutrition director, as follows:

"No condition of unpalatability or digestive disorders in any commercial or test ration containing urea could be traced to this ingredient.

"The percentage of butterfat and protein in the test group and in the control group* did not differ significantly.

"Milk production during the first seven months of lactation was the same in the test group as in the control group.

"Urease activity was observed in all silage tested; but under average conditions of time, temperature, and moisture there was no practical destruction of urea when added to a dairy ration and placed over the silage in the manger."

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*Formulas of test and control rations are shown in Table 1.

Urea, used to replace part of the natural protein in dairy rations, gives satisfactory milk production and milk composition, and does not adversely affect the palatability of feed or the health of the cows.

So says Dr. W. H. Hastings, reporting results of an experiment conducted by Lindsey-Robinson & Co., Roanoke, Va., feed manufacturers, in "Journal of Dairy Science," Vol. 27, No. 12. He points out that while further tests are being made to determine results over a longer period of time, it was shown that "over the short period of this test, urea can be used in dairy rations without unfavorable results."

In this test, a herd of registered, high-producing, healthy, well-managed Holsteins, owned by a local college, was used. Seven cows were chosen as the test group and 15 as the control group for record comparisons. These 22 cows were near the herd average in age and previous production, and had freshened between September and November. All silage, hay and grain were weighed at each feeding. The cows were milked twice daily and the milk weighed.

Continued on next page

The formulas for the grain used in the test and control rations follow:

Table 1

Ingredients	Control Ration	Test Ration Nov.	Dec.	Jan.	Feb.	Mch. Apr. May
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Corn meal	400	400	400	400	400	
Wheat bran	250	250	250	250	250	
Distillers' grain	400	400	400	400	300	
Corn gluten feed	350	200	100	...	...	
Crimped oats	200	200	200	200	200	
Yellow hominy	...	310	400	490	580	Same
Crystal urea	...	35	42	50	60	as
Soybean oil meal	200	...	...	...	...	Feb.
Molasses	140	140	140	140	140	
Limestone	20	20	20	20	20	
Bone meal	20	25	28	30	30	
Iodized salt	20	20	20	20	20	
Total	2000	2000	2000	2000	2000	2000

The average chemical composition is 20.6 per cent protein, 4.5 per cent fat, 7.2 per cent fiber.

Dr. Hastings' report on milk production, milk composition, and feed composition on the test and control rations, follows:

Table 2

	Test Ration	Control Ration
Number of cows fed	7	15
Number of days in period	210	210
Daily feed, pounds per cow		
Grain	10.8	10.5
Hay	10.0	10.0
Silage	21.4	21.4
Daily milk, pounds per cow	36.0	35.0
Per cent of fat	3.3	3.4
Per cent of protein	3.2	3.0
Average Weight, pounds -- April	1443	1382
June	1471	1411
Average gain, pounds	28	29

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The report points out that milk production, milk fat, and milk protein in the test group were maintained at a level equal to that in the control group, within the limits of probable error.

(In a letter to the editor of the "Agricultural News Letter," dated February 9, 1945, Dr. Hastings said: "I would like to add a note on the record for the first five months of the second lactation. From October, 1944, through January of this year, each group averaged 2 pounds a month more than it averaged during the test as reported in 'Journal of Dairy Science.' This is conclusive that the cows were not hurt by the test feed and that both groups are continuing at a higher level of production than for the previous lactation.")

Palatability of Feeds

The published report reveals that the company had received complaints of feed refusal and digestive disorders among cows on urea-containing feeds, but upon investigation, some condition other than the urea was found to be the cause in each case. Sometimes in returning to the milking ration from a fitting ration*, the cows refused the feed and remained off feed when offered a ration not containing urea. He adds:

"With the herd on test, no trouble with palatability or off-feed was experienced during the entire period. On a group of six cows the feed was changed overnight, and each time the test ration or the control ration was consumed with equal relish."

A herd of Guernseys receiving a commercial ration containing no molasses was tested for its reaction to urea. Three per cent urea was added to this dried ration and fed for four days. "No cow in the herd showed any signs of refusing the feed," Dr. Hastings reports.

Common Feeding Practice

Dr. Hastings explains that the feeding plan for this herd is quite common to most farms in that area.

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* A feed especially high in T.D.N., with a higher percentage of molasses and minerals than a regular dairy feed. It is composed chiefly of grains low in fiber and low in protein, and is used for dry-cow feeding.

NOTE: A reprint of the report by W. H. Hastings, published in the "Journal of Dairy Science," will be sent on request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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DYNAMITE MAKES UNTILLABLE LAND YIELD 85 BUSHELS OF CORN PER ACRE

"Ditching with dynamite is a far cry from the slow, back-breaking process of digging by hand. It leaves a straight clean-cut channel of the same depth and width throughout with no dirt piles on the banks."-- Ray Pavlak, Former County Agent, Agricultural Extension Service, Monroe, Green County, Wisconsin.

After a brief try at hand digging, Harry and Henry Klassy, farmers in Green County, Wisconsin, decided that "there must be an easier way to dig ditches than by shoveling," and turned to ditching dynamite to do the job.

They were so completely satisfied with the results of their initial trial, made in 1935, that they expanded their ditching operations from year to year. Their success inspired several neighbors to follow their example, extending the main channel and building lateral ditches, connecting their own land areas into one system.

One of the most profitable of the lateral ditches was that blown on the Henry C. Elmer farm in 1942. Considerable land on his newly purchased farm was too low to be cropped, so Mr. Elmer and his neighbors blew ditches to the Little Sugar River. In 1943 he was able to plant 80 acres of what had been worthless land. Forty acres of this land were in corn which yielded 85 to 100 bushels per acre the first year.

Ditches Drain Excess Water From Good Land

These are typical of numerous reports to the Du Pont Explosives Department indicating that thousands of miles of new ditches are being dynamited on millions of acres of American farms annually to drain excess water from otherwise highly fertile, tillable land.

County agricultural agents are cooperating with local merchants, farmers, and others interested in soil drainage and conservation throughout the country. In fact, the report of the work in Wisconsin was originally made by Ray Pavlak, until recently County Agent at Monroe, Wisconsin, and published in a recent issue of "Wisconsin Agriculturist and Farmer."

Provides Easier, Quicker, and More Economical Ditch Construction

Mr. Pavlak says that several miles of drainage ditches, with numerous lateral ditches from the original channel, have been built with dynamite in Green County, quicker, easier, and more economically than by the old-fashioned method of digging by hand. The latest activity was the blowing of a lateral ditch in 1944 on the Fred C. and Herman Karlen farm and on the Klassy farm.

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Overflow From Spring Causes Trouble

According to County Agent Pavlak, a spring caused the original trouble on the Klassy farm, rendering untillable the surrounding land. Harry Klassy, after a discouraging attempt at laborious digging with pick and shovel, contacted Charles Ritter, who conducts a dynamite business at Mineral Point. Mr. Ritter and his associates had never used dynamite to blast ditches on farms, but by experimenting and carefully following the manufacturer's directions they blew out the first ditch by dynamite in Green County.

Neighbors Form Cooperative Labor Pool

"The experiment proved so successful that the following year, Mr. Klassy and his neighbors started a real ditching project," Mr. Pavlak says. "The Little Sugar River, which is dammed at Monticello, had become so filled with sediment that water from the surrounding land could no longer drain into it. Rather than do dredging, the neighbors, who formed a cooperative labor pool similar to that used during threshing, decided to dynamite the Little Sugar River and make it again a proper channel to drain their lands."

Mr. Pavlak says that numerous delays were caused by changes in ownership of farms, but that the ditching system now drains the Klassy farm, the H. C. Elmer farm, and the lands of Herman G. Karlen, Jacob Elmer, Ed Schlittler, Ernest Wenger, Clarence Elmer, Ulrich Gerber, Robert Feller, and Jacob Koller.

Ditching Opens River Channel and Straightens Creek Bed

Mr. Pavlak says that not only did the ditching open up the Little Sugar River channel, it straightened a creek bed, taking out the curves and permitting freer flowing. At the same time, the farmers adopted soil-saving practices to keep their fertile soils from washing from the hillsides into the drainage ditches.

He explains that the farmers in Green County lay out the area to be ditched, stretching binder-twine as the straight line for the channel. Two farmers with a T-shaped bar punch holes to the desired depth, usually about three feet, and two or more other farmers follow directly to place the dynamite in these holes. For a ditch six feet deep, three sticks of dynamite are placed in holes two feet apart, according to Mr. Pavlak's report, which adds:

"A fuse is fastened only to the last stick of dynamite and is exploded by electricity. The concussion sets off the other loads and the entire ditch seems to be blown with one blast. Dynamite used for this ditching operation is of a special variety called ditching dynamite. Blasting dynamite will not work by concussion."

He adds that a number of farmers in Exeter township have also used dynamite for ditching and believes others in Green County will follow this practice.

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PRODUCING MORE BEEF FROM PHOSPHORUS-DEFICIENT RANGES

Research based on observations of a government scientist assigned to South Africa nearly 15 years ago, on the value of supplemental feeding of phosphorus to beef cattle grazing on soils deficient in that element, has developed information worth millions of dollars to the American livestock industry.

Here's the story, as reviewed in U. S. Department of Agriculture Research Achievement Sheet No. 7A, recently issued:

"In the Gulf Coast region and other parts of the South, where the soil and vegetation are deficient in phosphorus, the feeding of small amounts of this mineral to cattle is now known to increase beef production. Benefits include larger and more regular calf crops and more rapid and economical gains."

The statement says the Department's research leading to this knowledge dates back to 1931, when William H. Black of the Bureau of Animal Industry studied the beef-cattle industry in the Union of South Africa, where much of the land is deficient in phosphorus. Mr. Black, now senior animal husbandman of the Bureau at Beltsville, Md., observed that cattle in such areas often received a supplemental feeding of bone meal, which supplies phosphorus.

"He noted the high fertility of the cows, as indicated by the large number of calves," according to the government's report. "The cattle were in good flesh, with evidence of good bone development. He also noted that the South African veld resembled range areas in Texas, Arizona, and New Mexico."

Tests Conducted At State Experiment Stations and on King Ranch

The statement continues: "On his return to the United States, Black made plans to determine whether the feeding of phosphorus or other minerals would be beneficial here under similar conditions. Work conducted by the Texas, New Mexico, and other state experiment stations, before or about that time, supported the likelihood of such benefits. In 1937 the Bureau of Animal Industry began a study of the problem in cooperation with the Texas station and the King Ranch of that state. Analysis of forage samples as well as blood samples from cattle of the area showed phosphorus deficiencies, but supplies of other important minerals were apparently adequate. In experiments to determine what benefits might be derived from a phosphorus supplement, four groups of young cows were fed on the range. One group received no supplement. The other three received, respectively, disodium phosphate, bone meal, and bone meal with small quantities of other minerals, by hand-dosing six times a week. Most of them received 6.5 grams of phosphorus per head daily, but lactating cows got about twice as much.

Continued on next page

"Analyses of records for two calving seasons showed that 85 per cent of the cows receiving a phosphorus supplement produced calves, as compared with 64 per cent for the other cows. Calves from the supplement-fed cows averaged 69 pounds more at weaning, and 126 pounds more at 18 months of age, than the others. After deduction of the cost of the supplement, the value of the weaned calves averaged $5.78 more."

In further tests phosphorus is being supplied (1) in the form of bone meal placed in self-feeders, (2) by dissolving disodium phosphate in the drinking water, (3) by feeding a mixture of 90 per cent disodium phosphate and 10 per cent cottonseed meal in self-feeders, and (4) by applying a superphosphate fertilizer to the pasture. All methods appear to be satisfactory.

Further Studies Being Conducted To Improve Methods of Administering

Research achievement Sheet No. 7A says the results of these studies have application, in the United States, in areas where about 15,000,000 cattle -- about a fifth of the nation's total -- are raised. It adds:

"Since the first announcement of results in 1938, further studies have been conducted with the view to improving methods of administering the phosphorus. This phase of the work is still in progress. Meanwhile many ranchers of the Southwest who have attended field-day demonstrations where results of the studies were shown are supplying phosphorus, in some form, to their cattle."

In addition to Mr. Black, credit is given to Lowell H. Tash, N. R. Ellis, Paul E. Howe, Bureau of Animal Industry; and J. M. Jones, H. Schmidt, and G. S. Fraps, Texas Agricultural Experiment Station.

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CROOKED STREAM RETARDS WATER RUNOFF

A crooked stream retards the rate of flow of water from 30 to 60 per cent. Straightening a winding stream and elimination of vegetation and sediment from the bottom frequently double its capacity for disposing of runoff water from adjacent farmlands.

When dynamite is used, the size of the stream governs the method of blasting. The method used to blow out small, narrow ditches differs from that for blasting wide, shallow ditches; while large ditches or streams, up to 36 feet wide and 12 feet deep, call for still another procedure. On all jobs of this type, an experienced blaster should be employed, according to Du Pont's new booklet, "Ditching with Dynamite," which gives full details on the various methods to use.

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STUDIES ON USE OF FORMALDEHYDE COMBINED WITH SODIUM ORTHO-PHENYL-PHENATE SOLUTION IN CONTROL OF DECAY AND RIND INJURY IN CITRUS FRIUT

Two government scientists, working in Florida, recently discovered that proper treatment of harvested citrus with a certain chemical compound reduced fruit decay satisfactorily, but unfortunately increased rind injury so much that its use as a disinfectant was greatly limited. These two research workers decided to try another chemical, along with the one that retarded decay but increased rind injury, to determine whether the combination of the two compounds, rightly applied, might be the answer to their problem. Their findings are reviewed briefly below.

Addition of formaldehyde to sodium ortho-phenyl-phenate, which inhibits decay of citrus fruit, largely eliminates rind injury which usually develops when the latter compound is used alone.

This important discovery was recently announced by Erston V. Miller, plant physiologist, and J. R. Winston, senior horticulturist, U. S. Horticultural Laboratory at Orlando, Fla., who emphasize that the mixture must be applied as a warm flood spray or bath and not as a mist spray.

These scientists conducted a series of experiments in which a combination of the two chemical compounds was used to disinfect the fruit. They had previously tested many new compounds for their effect in the control of decay of citrus fruits in storage and transportation, and had found that although sodium ortho-phenyl-phenate alone, properly applied, did a good job of preventing decay, some rind injury usually developed before the fruit reached the consumer.

Subsequently, a series of laboratory experiments showed that addition of formaldehyde (USP strength, 37 per cent by weight) to an aqueous solution of sodium ortho-phenyl-phenate largely eliminated rind injury when the combination was applied as a warm flood spray or bath.

Because of the encouraging results of their preliminary tests, Miller and Winston made further studies under actual operating conditions in cooperation with two packing houses. These tests confirmed their earlier findings that the mixture is effective in controlling decay and in preventing rind injury when applied as a warm flood spray or bath.

The Florida scientists also report that a number of packing houses are prepared to use the treatment this season.

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